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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/609,115	06/27/2003	James T. Gleeson	KSU.P0213	8164

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EXAMINER	
DI GRAZIO, JEANNE A	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 08/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/609,115	GLEESON ET AL.
	Examiner	Art Unit
	Jeanne A. Di Grazio	2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-7 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-7 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

Priority is not claimed.

Claim Objections

Claim 1 is objected to because of the following informalities. As to claim 1, the recitation, "wherein said convective rolls are arranged periodically *in space* ..." is objected to as confusing. The Examiner suggests "periodically in *the* space."

Appropriate correction is **required**.

Claim 2 is objected to because of the following informalities. As to claim 2, the limitation, "grating constant" (grating spacing) is not defined in the Specification. Applicant states that the grating constant (grating spacing) can be tuned during the manufacturing of the diffraction grating by controlling the amplitude and frequency of the applied electric field (Specification at Page 2, Lines 29-30) and that the grating constant is believed to be significantly dependent upon the distance between walls and the frequency of the applied electric field (Specification at Page 7, Lines 5-7). Applicant also states that the grating constant decreases as frequency increases (Specification at Page 8, Lines 5-6) and that the grating constant is "frozen in" after the formation of the polymeric network (Specification at Page 8, Lines 12-13). However, descriptions of how the grating constant is affected by electric field amplitude and

frequency, how the grating constant relates to frequency, and its being "frozen in" after formation of the polymeric network are not definitions.

For examination purposes, the Examiner interprets "grating constant" to read on the prior art.

Appropriate correction is **required**.

Claim 4 is objected to because of the following informalities. As to claim 4, the word "templated by" is objected to because its meaning is not clear. A template is something that establishes or serves as a pattern or an overlay." (Merriam Webster's Collegiate Dictionary 10TH Ed. at Page 1209)(defining the noun "template"). However, 'template" is a noun. Thus, to recite "templated by" as a verb renders the claim unclear. In Applicant's Specification, Applicant states that "a polymeric network is templated or bounded by the array of convective rolls." (Page 5, Lines 24-25).

For examination purposes, the Examiner interprets "templated by" to mean that the polymeric structure stabilizes the convective roll structure.

Appropriate correction is **required**.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claims 3 and 7, the limitation, "structure factor" is not defined in the Specification. Applicant states that the structure factor can be *tuned* during the manufacturing of the diffraction grating by *controlling* the amplitude and frequency of the applied electric field (Specification at Page 2, Lines 29-30) and that the structure factor can be *tuned* after polymerization and or cross-linking during the operation of the diffraction grating (Specification at Page 8, Lines 10-11). However, descriptions of how the structure factor is affected by electric field amplitude and frequency and its ability to be tuned after polymerization and or cross-linking are not definitions.

Upon review of the art of liquid crystals, it appears to the Examiner that "structure factor" may have multiple possible meanings. For example, the structure factor may relate to the structure of the liquid crystal upon movement of the liquid crystal molecules or structure factor may relate to thermal-mechanical factors. Because there is no clear definition in the art as to what a structure factor is, it is not currently possible to determine what Applicant means by "structure factor." Accordingly, the claims are rendered indefinite.

For examination purposes, the Examiner interprets "structure factor" to read on the prior art.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent 5,995,173 (to Barberi et al.) in view of United States Patent 5,434,685 (to Pirs et al.).

As to claim 1, Barberi teaches and discloses, with reference to at least Figure 2, a cell with a first cell wall (confinement plate 30) spaced from a second cell wall (confinement plate 20), electrodes (22 and 32) disposed on facing surfaces of the first (30) and second (20) cell walls, an array of nematic (Column 2, Lines 48-49) liquid crystal convective rolls (Column 4, Lines 43-47), wherein said convective rolls are arranged periodically in the space between said first cell wall (30) and said second cell wall (20)(See Figure 2, illustrating a plurality of convective liquid crystal coils).

Barberi does not appear to explicitly specify a polymeric network stabilizing said array of nematic liquid crystal convective rolls.

Pirs teaches and discloses a ferroelectric liquid crystal cell exhibiting a chiral nematic phase (Example 1, Column 6), a method of making it, and its use (Title, entire patent). Pirs teaches that a polymer can be used to stabilize the arrangement of molecules of the cell so that the properties of the cell can be maintained, susceptibility to shock is reduced, the distance between cell walls is maintained, and flow of liquid crystal within the cell is prevented (Column 1, Lines 63-68 and Column 2, Lines 1-5).

Pirs is evidence that ordinary workers in the field of liquid crystals would have found the reason, suggestion, and motivation to include a polymer network into a liquid crystal cell to stabilize the arrangement of molecules of the cell so that the properties of the cell can be maintained, susceptibility to shock is reduced, the distance between cell walls is maintained, and flow of liquid crystal within the cell is prevented (Column 1, Lines 63-68 and Column 2, Lines 1-5).

Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify Barberi in view of Pirs so that the properties of the liquid crystal cell can be maintained, susceptibility to shock is reduced, the distance between cell walls is maintained, and flow of liquid crystal within the cell is prevented.

As to claim 2, it may be presumed that the convective rolls are arranged with a grating constant approximately twice the separation distance between the first and second cell walls since Applicant has not provided a definition of "grating constant" and because an electric field

is applied to the cell walls (Barberi, Figure 2, electrical supply means that apply an electric field between the confinement plates (40)).

As to claim 3, Barberi teaches and discloses an electrical supply means for applying an electric field (40) between confinement plates (30 and 20) of Figure 2. It may be presumed that the coils of liquid crystal are arranged with a structure factor and that the structure factor (meaning possibly the shape of the coils, thermal-mechanical factors of the coils, etc.) is adjusted because of the electrical supply means (40).

As to claim 4, the method for producing a diffraction grating would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made in view of the structure as taught and disclosed by Barberi in view of Pirs.

As to claim 7, Barberi teaches and discloses an electrical supply means for applying an electric field (40) between confinement plates (30 and 20) of Figure 2. It may be presumed that the coils of liquid crystal are arranged with a structure factor and that the structure factor (meaning possibly the shape of the coils, thermal-mechanical factors of the coils, etc.) is adjusted because of the electrical supply means (40).

Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent 5,995,173 (to Barberi et al.) in view of United States Patent 5,434,685 (to Pirs et al.) and further in view of United States Patent 4,590,146 (to Wallbillich).

As to claims 5 and 6, Barberi does not appear to explicitly specify that the initiator is a photoinitiator and the initiator is activated in the step of stabilizing to initiate the formation of the polymer network from the polymerizable precursor.

Wallbillich teaches and discloses stabilization of photopolymerizable mixtures including photoinitiators and teaches that such mixtures have to be stabilized to prevent spontaneous thermal polymerization (Column 1, Lines 16-19).

Wallbillich is evidence that ordinary workers in the field of liquid crystals would have found the reason, suggestion, and motivation to photopolymerize with an initiator to prevent spontaneous thermal polymerization.

Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify Barberi in view of Wallbillich to prevent spontaneous thermal polymerization.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeanne A. Di Grazio whose telephone number is (571)272-2289. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached on (571)272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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JDG

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